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PEARLS OF LABORATORY MEDICINE

Aldosterone and Renin

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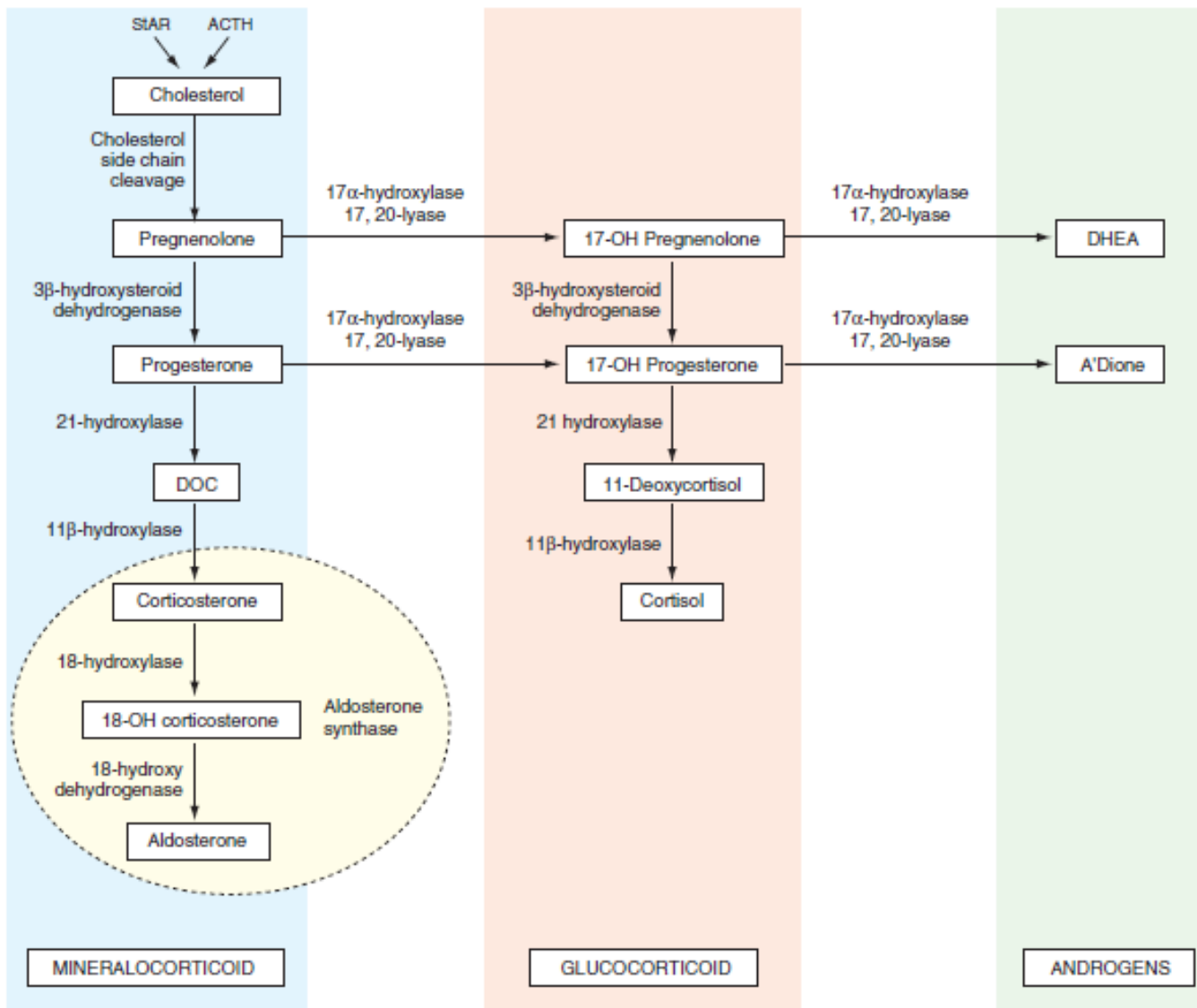


Anatomy and Products of the Adrenal Gland

Adrenal Layer	Major Products	Action
Cortex		
Zona glomerulosa	Aldosterone	Mineralocorticoid
Zona fasciculata	Cortisol	Glucocorticoid
Zona reticularis	Dehydroepiandrosterone Androstenedione	Adrenal androgen
Medulla	Epinephrine	Catecholamine



Biosynthesis of Adrenocortical Hormones

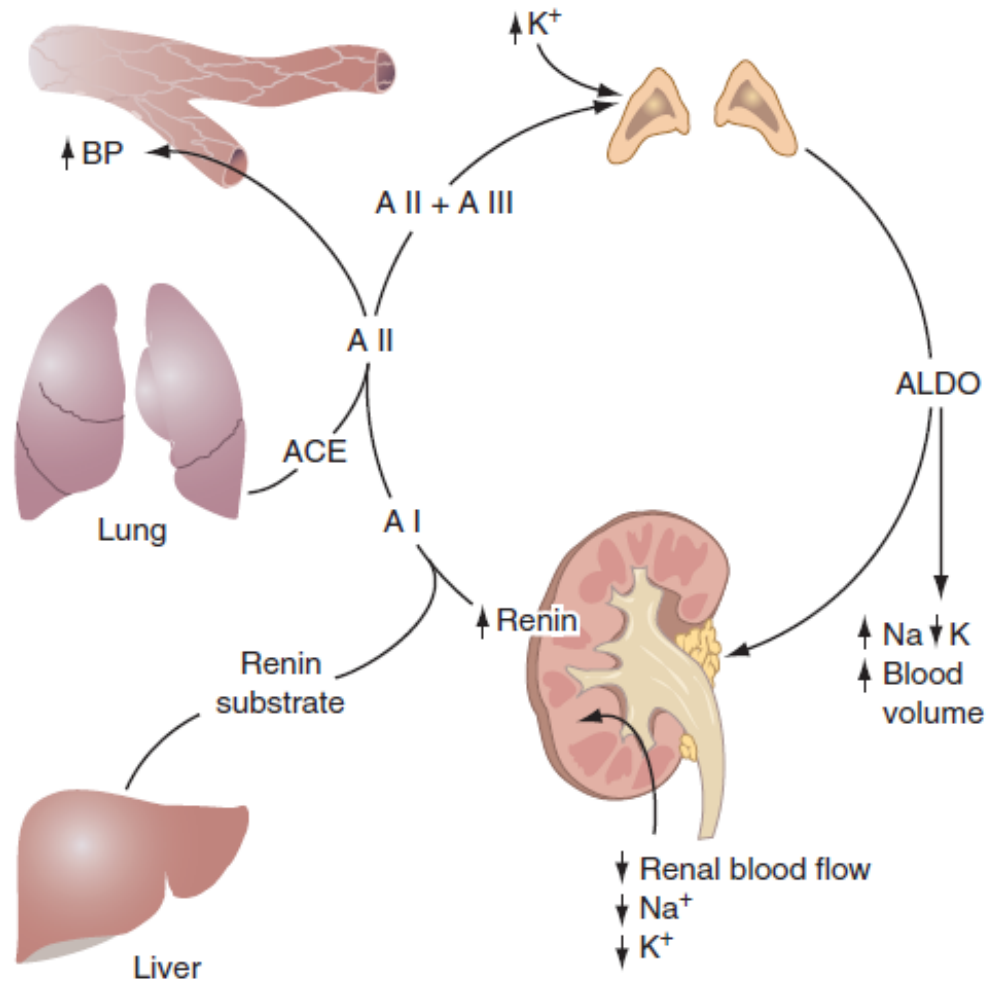


Major Actions of Mineralocorticoids

Action	Excessive Action	Deficient Action
Sodium retention	Hypertension	Hypotension
Urinary potassium wasting	Hypokalemia	Hyperkalemia
Urinary hydrogen ion wasting	Alkalosis	



Renin-Angiotensin-Aldosterone System (RAAS)



Hyperaldosteronism

- Primary (hyporeninemic)
 - Adrenal adenoma
 - Bilateral adrenal hyperplasia
 - Glucocorticoid remediable hyperaldosteronism
 - Unilateral adrenal hyperplasia
 - Adrenal carcinoma
- Secondary (hyperreninemic)



Diagnosis of Primary Hyperaldosteronism

- Hypertension resistant to three conventional anti-hypertensive drugs
- Controlled blood pressure on four or more anti-hypertensive drugs
- Hypertension in the presence of a known adenoma
- Hypertension and spontaneous or diuretic-induced hypokalemia
- Hypertension and sleep apnea
- Hypertension and a family history of early onset hypertension or cerebrovascular accident at a young age (<40 years old)

Pseudoaldosteronism

- **Acquired**
 - Excess of glucocorticoids— hypercortisolism, Cushing's syndrome, or high dose steroid therapy
 - Inhibition of 11-beta-hydroxysteroid dehydrogenase type 2— glycyrrhizin
- **Genetic**
 - Absence of 11-beta-steroid hydroxylase
 - Liddle syndrome

Hypoaldosteronism

- Primary defects in adrenal secretion of aldosterone
 - Congenital causes (eg. Congenital adrenal hyperplasia)
 - Acquired causes
 - Autoimmune adrenal destruction (eg. Addison's disease)
 - Infectious adrenal destruction (eg. Amyloidosis, sarcoidosis)
 - Traumatic, hemorrhagic or thrombotic adrenal destruction
 - Bilateral adrenalectomy



Laboratory Evaluation

Measurement of Aldosterone

- Radioimmunoassay
- Immunoassays (chemiluminescence)
- LC/MS-MS

Measurement of Renin

- Renin activity
- Direct renin



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Disclosures/Potential Conflicts of Interest

Upon Pearl submission, the presenter completed the Clinical Chemistry disclosure form. Disclosures and/or potential conflicts of interest:

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